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DERWENT-WEEK: 200511

TITLE: Aqueous dispersion liquid - comprises aqueous dispersion liquid, comprising (meth)acrylic **acid and potassium salt of ethylene@!-(meth)acrylic acid** copolymer, and high polymer aqueous dispersion liquid

PATENT-ASSIGNEE: **MITSUI** DU PONT POLYCHEMICAL KK[DUPO]

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BASIC-ABSTRACT:

An aq. dispersion liq. comprises: (A) an aq. dispersion liq. comprising 10-30 wt.% of (meth)acrylic acid and 2-50 wt.% (solid content) of a potassium salt of **ethylene-(meth)acrylic acid** copolymer having a melt flow rate (190

deg. C,
2160 g load) of 1-1500 g./10 min. and a degree of neutralisation of not less
than 75 % ; and (B) a high polymer aq. dispersion liq. having an average
particle **size** (determined by light scattering method) of 1 nm-200 mu m, a solid
content of 2-60 wt.% and a pH of not lower than 7.

The ratio (A)/(B) is 1/99-99/1 in the weight ratio of solid contents.

USE - The aq. dispersion liq. is useful for e.g. inks, paints or adhesives.

ADVANTAGE - A coated film, formed by applying the aq. dispersion liq. to a base
material, has antistatic effect and improved physical characteristics (e.g.
water resistance). The aq. dispersion liq. has good adhesiveness to base
materials, water resistance, flexibility, lustre, oil resistance, film-forming
characteristics, anti-clouding effect, transparency, filler dispersibility and
printing adaptability.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: AQUEOUS DISPERSE LIQUID COMPRISE AQUEOUS DISPERSE LIQUID COMPRISE
METHO ACRYLIC ACID POTASSIUM SALT POLYETHYLENE@ METHO ACRYLIC ACID
COPOLYMER HIGH POLYMER AQUEOUS DISPERSE LIQUID

ADDL-INDEXING-TERMS:
ACRYLIC! METHACRYLIC!

DERWENT-CLASS: A14 A81 A82 A97 G02 G03

CPI-CODES: A04-F04; A04-G08A; A07-B; G02-A02C4; G02-A02D; G02-A04A; G03-B02D1;
G03-B02D3;

ENHANCED-POLYMER-INDEXING:
Polymer Index [1.1]
018 ; R00326 G0044 G0033 G0022 D01 D02 D12 D10 D51 D53 D58 D82 ;
R24000 G0282 G0271 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D61 D83
F36 F35 K* 1A ; H0022 H0011 ; S9999 S1025 S1014 ; S9999 S1285*R
; P1150 ; P0088

Polymer Index [1.2]
018 ; G0306*R G0271 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D84 F36 F35 K* 1A ; R00326 G0044 G0033 G0022 D01 D02 D12 D10 D51 D53 D58 D82 ; H0022 H0011 ; S9999 S1025 S1014 ; S9999 S1285*R ; P1150 ; P0088

Polymer Index [1.3]
018 ; R00446 G0282 G0271 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D60 D83 F36 F35 ; R00460 G0306 G0271 G0260 G0022 D01 D12 D10 D26 D51 D53 D58 D60 D84 F36 F35 ; H0000 ; S9999 S1025 S1014 ; S9999 S1285*R ; P0088 ; P0099

Polymer Index [1.4]
018 ; R00835 G0566 G0022 D01 D11 D10 D12 D51 D53 D58 D63 D84 F41 F89 ; H0000 ; S9999 S1285*R ; S9999 S1025 S1014

Polymer Index [1.5]
018 ; R00326 G0044 G0033 G0022 D01 D02 D12 D10 D51 D53 D58 D82 ; R00835 G0566 G0022 D01 D11 D10 D12 D51 D53 D58 D63 D84 F41 F89 ; H0022 H0011 ; S9999 S1285*R ; S9999 S1025 S1014 ; P1150 ; P1310

Polymer Index [1.6]
018 ; G0260*R G0022 D01 D12 D10 D26 D51 D53 ; R00708 G0102 G0022 D01 D02 D12 D10 D19 D18 D31 D51 D53 D58 D76 D88 ; H0011*R ; S9999 S1285*R ; S9999 S1025 S1014 ; P1741 ; P0088

Polymer Index [1.7]
018 ; ND04 ; Q9999 Q6644*R ; Q9999 Q7169 Q7158 Q7114 ; Q9999 Q8797 Q8775 ; B9999 B3305 B3292 B3190 ; B9999 B4706*R B4568 ; B9999 B5301 B5298 B5276 ; B9999 B4035 B3930 B3838 B3747 ; B9999 B4400*R B4240 ; B9999 B3496 B3485 B3372 ; K9745*R ; Q9999 Q7114*R ; B9999 B3598 B3554 ; B9999 B5356 B5276 ; B9999 B4397 B4240 ; K9870 K9847 K9790 ; B9999 B5243*R B4740 ; N9999 N7147 N7034 N7023 ; K9483*R

SECONDARY-ACC-NO:
CPI Secondary Accession Numbers: C1999-012663

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the aquosity dispersion liquid which can form the spreading film excellent in the antielectricity characteristic.
[0002]
[Description of the Prior Art] Conventionally, the various aquosity dispersion liquid which the very fine particle of various high molecular compounds distributed underwater were developed, and it is used as a coating agent or adhesives. In the application which dislikes especially adhesion of the dirt of the spreading film and dust, to give an antielectricity characteristic to the spreading film formed from such aquosity dispersion liquid is desired. However, since not almost all high molecular compounds had sufficient antielectricity characteristic, in many cases, the spreading film from the aquosity dispersion liquid which do not contain a surfactant did not have sufficient antielectricity characteristic. Moreover, although a surfactant is incorporated and the spreading film from the aquosity dispersion liquid containing a surfactant may show an antielectricity characteristic in the film, it has problems, such as a fall of an antielectricity characteristic with time, according to the vaporization exfiltration of contamination on the front face of the film, or a surfactant by the bleeding of a surfactant, and was not able to be said to be what should be satisfied enough.
[0003] As one of the aquosity dispersion liquid of such a high molecular compound, what uses the ionomer of ethylene and (meta) an acrylic-acid copolymer as the base is known for many years, and many proposals about the use are also made. And (meta) an acrylic-acid content is large, and even if a surfactant is not used for the ionomer of whenever [neutralization] large enough, becoming aquosity dispersion liquid stable enough is also known. Although most aquosity dispersion liquid in these proposals set the aquosity dispersion liquid which specifically make sodium ion or ammonia ion the ion source as the main object, it makes potassium ion the ion source and there is much what is mentioned also about usabiilty, there are not so many concrete examples of use. And the spreading film obtained from the aquosity dispersion liquid which make sodium ion and ammonium ion the ion source does not have usually sufficient antielectricity characteristic.
[0004] However, the inside of the ionomer aquosity dispersion liquid which make potassium ion the ion source, (Meta) The spreading film with which an acrylic-acid content is greatly formed from the high thing of whenever [neutralization] Although it is known that sufficient antielectricity characteristic is shown, (for example, JP,60-240704,A, JP,4-339849,A, JP,8-231791,A, etc.) It has the fault that on the other hand the trouble out of which slime comes to the spreading film or which the water resisting property of the spreading film is bad, and is milked arises, and the use field is limited. Moreover, there is also a fault that the flexibility of the spreading film is inferior, and the crack of the spreading film may arise according to deformation, and it is inferior to adhesion to polyester or polyolefine. There was almost no proposal which improves all the above faults, without spoiling the antielectricity characteristic of the spreading film conventionally formed from such potassium ionomer aquosity dispersion liquid.
[0005]

[Problem(s) to be Solved by the Invention] While giving the antielectricity characteristic to the spreading film by mixing the aquosity dispersion liquid of the above potassium ionomers to the macromolecule aquosity dispersion liquid, as for this invention persons, the spreading film does not indicate an antielectricity characteristic to be in view of such a situation, the attempt which improves the description of the spreading film from potassium ionomer aquosity dispersion liquid was performed. However, both mixture had the case where the outstanding property which cannot give an antielectricity characteristic unless it carries out considerable-amount combination of the potassium ionomer, therefore the high-molecular-compound spreading film originally has was sacrificed, from a viewpoint of grant of the antielectricity characteristic of the spreading film, when it did not become stable aquosity dispersion liquid depending on the description of high-molecular-compound aquosity dispersion liquid and stable aquosity dispersion liquid were obtained by both mixing. moreover, the description of the potassium ionomer spreading film -- it became clear also from a viewpoint of an improvement that sufficient improvement may be unable to be attained depending on little combination of macromolecule aquosity dispersion liquid.

[0006] Then, this invention persons knew that the mixed water nature dispersion liquid which can form the spreading film which has the property which has an antielectricity characteristic and was excellent in addition to this would be obtained by choosing suitably description, the blending ratio of coal, etc. of aquosity dispersion liquid of both, as a result of inquiring to a pan per these mixed stock. Therefore, the purpose of this invention is to offer the mixed water nature dispersion liquid excellent in storage stability which can form the spreading film which has an antielectricity characteristic and the other outstanding descriptions.

[0007]

[Means for Solving the Problem] For this invention, an acrylic-acid (meta) content is 10 - 30 % of the weight, and a melt flow rate (190 degrees C). The aquosity dispersion liquid whose solid content concentration of 75% or more of potassium salt whenever [neutralization / of the ethylene and (meta) the acrylic-acid copolymer for 1-1500g / 10 minutes] is 2 - 50 % of the weight for 2160g load (A), The mean particle diameter measured with light scattering measurement is related with the aquosity dispersion liquid to which seven or more macromolecule aquosity dispersion liquid (B) are blended with by the solid content weight ratio, and it comes to blend pH (A)/(B) at a rate of 1 / 99 - 99/1 for 1nm - 200 micrometers and solid content concentration two to 60% of the weight. (An acrylic acid (meta) means an acrylic acid or a methacrylic acid here.)

[0008]

[The mode of implementation of invention] Whenever [according / an acrylic-acid (meta) content / preferably ten to 30% of the weight in ionomer aquosity dispersion liquid (A) used by this invention to potassium ion of 15 - 25% of the weight of ethylene and (meta) acrylic-acid copolymer neutralization] is aquosity dispersion liquid of 80 - 100% of potassium salt preferably 75% or more. Copolymerization of other monomers like acrylic ester (meta) other than ethylene and (meta) an acrylic acid may be carried out to the above-mentioned copolymer. Copolymerization of such other monomers is carried out in 20 or less % of the weight of the amount.

[0009] If a copolymer with few acrylic-acid (meta) contents than the above-mentioned range is used here, it will become difficult for obtaining dispersion liquid with water-dispersion [good] to obtain the spreading film with a good antielectricity characteristic difficultly. If a copolymer with more acrylic-acid (meta) contents than the above-mentioned range is used, since stable dispersion liquid are not not only obtained, but the water resisting property of the spreading film and a mechanical strength will fall on the other hand, it is not desirable. Moreover, if what has whenever [by potassium ion / neutralization / smaller than the above-mentioned range] is used, it will become difficult to obtain the spreading film with a good antielectricity characteristic.

[0010] As ethylene and (meta) an acrylic-acid copolymer, when water-dispersion, spreading film reinforcement, etc. are taken into consideration, it is desirable that the melt flow rate in 190 degrees C and 2160g load uses [1-1500g /] 50-1000g / thing for about 10 minutes especially for 10 minutes.

[0011] The above potassium ionomer aquosity dispersion liquid can be easily obtained by agitating

ethylene and (meta) an acrylic-acid copolymer, and a potassium hydroxide underwater above the melting point of this copolymer. When the ease of manufacture of aquosity dispersion liquid, stability, economical efficiency, etc. are taken into consideration, as for the solid content in aquosity dispersion liquid, it is desirable to adjust to about 5 - 50% of the weight especially two to 50% of the weight.
[0012] 1nm - 200 micrometers of mean particle diameter to which the aquosity dispersion liquid (B) used by this invention are seven or more things, and pH measured them with light scattering measurement are 5-20 micrometers preferably, and solid content concentration is 5 - 50% of the weight of a thing preferably two to 60% of the weight. If pH of aquosity dispersion liquid (B) uses less than seven thing, it cannot gel at the time of combination to aquosity dispersion liquid (A), and good aquosity dispersion liquid cannot be obtained. In addition, that from which pH serves as stable aquosity dispersion liquid by adjusting less than seven aquosity dispersion liquid to seven or more pH in basic water solutions, such as aqueous ammonia, is usable, and is adjusted by seven or more pH in advance of mixing with aquosity dispersion liquid.
[0013] Moreover, if aquosity dispersion liquid to which mean particle diameter exceeds 200 micrometers are used, since it cannot blend with aquosity dispersion liquid (A) and homogeneity but unevenness and a crack will arise on the spreading film, it is not desirable. About solid content concentration, if a not much high-concentration thing is used, since combination to aquosity dispersion liquid (A) will become difficult, it considers as the thing of the above-mentioned range.
[0014] As aquosity dispersion liquid (B), specifically Polyvinyl acetate, an ethylene-vinylacetate copolymer, Acrylic resin, styrene acrylic copolymers, and these 3 yuan or more copolymers, SBR, BR, MBR, NBR, CR, urethane resin, an urethane acrylic copolymer, An urethane vinyl copolymer, silicone resin, a silicone-acrylic copolymer, An epoxy resin, epoxy-acrylic copolymer, a fluororesin, a polyvinyl chloride, The water dispersing element of a polyvinylidene chloride and a vinylidene-chloride acrylic copolymer etc. can mention goods market research of an emulsion and given in a "manufacturer strategy" (the volume on CMC planet operation division, 1994). Furthermore, polyacrylamide system resin (police TRON: Arakawa chemical industry), Polyamide system resin (ARAFIKKUSU: Arakawa chemical industry), vinylidene-chloride system resin (KUREHARON: Kureha Chemical Industry), Polyester system resin (PESUREJIN: Takamatsu fats and oils), chlorination polypropylene (HARDLEN: East formation industry), Polyethylene (CHEMIPEARL: Mitsui petrochemistry) and ethylene propylene rubber (CHEMIPEARL: Mitsui petrochemistry), In addition, styrene resin, oxidization polyethylene system resin, chlorinated polyethylene system resin, Water dispersing elements, such as EPDM system resin, phenol resin system resin, maleic-anhydride graft polypropylene, maleic-anhydride graft polyethylene, and a maleic-anhydride graft polypropylene ethylene copolymer, can also be used. Two or more sorts of these can be used together.
[0015] aquosity dispersion liquid (A) and the rate of a compounding ratio of (B) -- a solid content weight ratio -- 1 / 99 - 99/1, although it is 5 / 95 - 95/5 preferably To employ the engine performance of the potassium ionomer spreading film efficiently as much as possible especially It is desirable 50 / 50 - 99/1, and to carry out the ratio of (A) and (B) to especially 60 / 40 - 95/5, and it is desirable 1 / 99 - 50/50, and that especially 5 / 95 - 30/70 carry out the ratio comparatively to employ the description of the spreading film of macromolecule aquosity dispersion liquid efficiently as much as possible.
[0016] Preparation of the mixed water nature dispersion liquid of this invention can be performed by mixing agitating aquosity dispersion liquid (A) and (B). In this case, there is especially no need for warming. moreover -- as an exception method -- the base resin of (A) and (B) -- beforehand -- a melt blend -- or dryblend can be carried out and it can also distribute underwater to the appropriate back. Anyway, this invention is not limited by such process.
[0017] The additive of arbitration can be blended with aquosity dispersion liquid (A) and aquosity dispersion liquid (B) either, both sides, or after both mixing. The polyhydric alcohol like a glycerol, a polyethylene glycol, and a polypropylene glycol as such an additive A water-soluble epoxy compound, a methanol, ethanol, and the monoalcohol like isopropyl alcohol Ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, Propylene glycol monomethyl ether, the propylene glycol monoethyl ether, Ether, such as diethylene glycol monoethyl ether and dipropylene glycol monomethyl ether, The

ester like propylene glycol mono-acetate and ethylene glycol mono-acetate, a pigment, a color, an anti-oxidant, an ultraviolet ray absorbent, light stabilizer, lubricant, an antiblocking agent, a plasticizer, antiseptics, a defoaming agent, a thickener, an antimicrobial agent, etc. can be mentioned.
[0018] The aquosity dispersion-liquid constituent obtained by this invention is excellent in storage stability, and useful as a cladding material to various base materials. As a base material which can apply such aquosity dispersion liquid For example, quantity, inside, low density polyethylene, ethylene, and an alpha olefin copolymer, An ethylene-vinylacetate copolymer, ethylene and (meta) an acrylic ester copolymer, Ethylene and (meta) an acrylic-acid copolymer or its ionomer, ethylene, an acrylic acid and (meta) an acrylic ester copolymer, or its ionomer, Polypropylene, poly1 butene, an olefin polymer like poly4 methyl 1 pentene, or a copolymer, Polystyrene, ABS system resin, styrene resin like a styrene butadiene block copolymer, Polyester like polyethylene terephthalate and polybutylene terephthalate, Nylon 6, a polyamide like Nylon 66, a polyvinyl chloride, and various polymers like the blend of these arbitration rates, metals, such as iron, steel, aluminum, and stainless steel, and wood -- it is attached and fiber, such as natural materials, such as a plate and paper, nature and synthetic leather, nylon, polyester, an acrylic, urethane, and rayon, textiles, a nonwoven fabric, etc. are illustrated -- it can ******.

[Effect of the Invention]
[0019] The spreading film which applied the aquosity dispersion liquid of this invention on such a base material, and was obtained By improving physical properties, such as a water resisting property, and choosing suitably a presentation and the rate of a compounding ratio of each component compared with the spreading film obtained from potassium ionomer aquosity dispersion liquid, while an antielectricity characteristic is shown It excels in the outstanding adhesive property over a base material, a water resisting property, flexibility, gloss, oilproof, a heat adhesive property, film production nature, fog resistance, blocking resistance, transparency, flexibility, coating nature, remelting nature, filler dispersibility, chipping-proof nature, ink absorptivity, a printability, etc. Therefore, it can use as ink, a coating, adhesives, etc.
[0020]
[Example] An example is given to below and this invention is explained to it in detail. In addition, the class of polymer which constitutes the aquosity dispersing element used in the example, the physical-properties measuring method, etc. are as follows.
[0021] 1. Potassium Salt Dispersion Liquid of Aquosity (Dispersing Element A) Ethylene Acrylic-Acid Copolymer (EAA-K, 90%)
The solid content 25wt% water dispersion which neutralized 90-mol% of the carboxyl group of an ethylene acrylic-acid copolymer (acrylic-acid content: 20 % of the weight, MFR:300) from the potassium [0022] (B) The various macromolecule aquosity dispersion liquid (B-1) which carried out macromolecule aquosity dispersion-liquid use - (B-15) a class, a trade name, pH, mean particle diameter, and solid content concentration were shown in Table 1.
[0023] In addition, physical-properties measurement of the above-mentioned macromolecule aquosity dispersion liquid is based on the following approach.
(1) pHJIS It is based on K6833.
(2) Particle-size laser-light-scattering type particle-size-distribution measuring device NICOMP It measures using 370HPL.
[0024]
[Table 1]

記号	種　類	商　品　名	メーカー名	ｐＨ	平均粒径（μｍ）	固形分濃度（wt%）
Ｂ－１	アクリル樹脂エマルジョン	ニューコートＫＴ－００２	新中村化学工業	7.0	0.10	４６
Ｂ－２	〃	バナテックスＦＢ－３０１	〃	6.5	0.17	４５
Ｂ－３	〃	バナレジンＨ７３０	〃	8.5	0.03	２０
Ｂ－４	スチレンアクリル樹脂エマルジョン	ＥＬポリマーＷＳ－５２－Ｕ	〃	10.0	1.03	１０
Ｂ－５	塩素化ＰＰエマルジョン	ＥＨ－２０２	東洋化成工業	9.0	0.50	２１
Ｂ－６	ＳＢＲエマルジョン	ＮＩＰＯＬＬＸ４２６	日本ゼオン	8.5	0.12	５０
Ｂ－７	〃	ＮＩＰＯＬＬＸ４１６	〃	8.0	0.11	４８
Ｂ－８	ポリエステルエマルジョン	ＴＡＤ１２００	東洋紡績	8.0	0.08	３６
Ｂ－９	〃	ＴＡＤ２２００	〃	8.0	0.08	３５
Ｂ－１０	〃	ＴＡＤ３２００	〃	8.0	0.10	３４
Ｂ－１１	エチレン・プロピレン共重合体エマルジョン	ケミパールＡ－１００	三井石油化学工業	9.0	8.70	４０
Ｂ－１２	ポリオレフィンエマルジョン	ケミパールＷ－２００	〃	9.0	4.69	４０
Ｂ－１３	〃	ケミパールＷ－５００	〃	9.0	1.84	４０
Ｂ－１４	ウレタンエマルジョン	スーパーフレックス－１０７Ｍ	第一工業製薬	7.5	0.05	２５
Ｂ－１５	ＥＶＡエマルジョン	ケミパールＶ－１００	三井石油化学工業	8.0	17.4	４０

[0025] 2. Base Material Biaxial-Stretching Polyethylene Terephthalate (OPET)
Thickness: 50 micrometers [0026] 3. Apply the measuring method aquosity dispersing element of the un-charging nature (surface resistivity) of paint film physical properties on a base material, and in order to remove the effect of additives, such as an emulsifier, wash in cold water once the sample film-ized by stoving enough. Then, after drying again and aging at the temperature of 23 degrees C, and 40% of relative humidity for 24 hours, the surface resistivity of a paint film side was measured with the Mitsubishi Petrochemical high resistivity plan (HIRESTA-IP).
[0027] As giant-molecule aquosity dispersion liquid, acrylic emulsion new coat KT-002 [given in Table 1] (B-1) was blended with the potassium salt aquosity dispersion liquid (A) of the ethylene acrylic-acid copolymer produced with the [example 1] conventional method so that it might become the ratio of A/B=7/3 by the solid content weight ratio. Applied the obtained mixed water nature dispersing element on the OPET base material, it was made to dry for 5 minutes at 150 degrees C, and the paint film with a thickness of 3 micrometers was produced. The aquosity dispersing element thin film obtained in this way measured surface resistivity by the approach of said 3. about the PET sheet formed in the front face. A result is shown in Table 2.

[0028] In the [examples 2-33] example 1 as macromolecule aquosity dispersion liquid instead of (B-1) The various macromolecule water dispersions of - (B-2) (B-15) given in Table 1 are used. Blended the potassium salt aquosity dispersion liquid (A) and the macromolecule water dispersion (B) of an ethylene acrylic-acid copolymer by the ratio which shows a solid content weight ratio (A/B) in Table 2 - 3, the paint film was made to form on an OPET base material like an example 1, and surface resistivity was measured. A result is shown in Table 2 - 3.

[0029] In the [examples 1-15 of comparison] examples 1-33, did not add the potassium DISU version of an ethylene-acrylic-acid copolymer, but applied only the various macromolecule water dispersions of - (B-1) (B-15) given in Table 3 on the base material, the paint film was made to form like examples 1-33, and surface resistivity was measured. A result is shown in Table 4.

[0030]

[Table 2]

	組成		表面抵抗率（Ω）
	高分子水性分散液（B）の種類	A／B配合比（固形分重量比）	
実施例1	B－1	7／3	9×10^{9}
実施例2	B－2	2／1	5×10^{8}
実施例3	B－2	1／2	5×10^{12}
実施例4	B－3	2／1	5×10^{8}
実施例5	B－3	1／2	8×10^{13}
実施例6	B－4	7／3	3×10^{8}
実施例7	B－4	6／4	8×10^{9}
実施例8	B－4	4／6	5×10^{8}
実施例9	B－5	5／1	4×10^{8}
実施例10	B－6	2／1	1×10^{9}
実施例11	B－6	1／2	2×10^{10}

[0031]

[Table 3]

	組　　成		表面抵抗率（Ω）
	高分子水性分散液（B）の種類	A／B配合比（固形分重量比）	
実施例12	B－7	7／3	1×10^{9}
実施例13	B－7	1／1	8×10^{9}
実施例14	B－7	1／2	6×10^{10}
実施例15	B－8	3／1	5×10^{11}
実施例16	B－9	3／1	2×10^{12}
実施例17	B－9	4／6	9×10^{11}
実施例18	B－9	3／7	2×10^{13}
実施例19	B－10	8／2	2×10^{11}
実施例20	B－10	4／6	4×10^{11}
実施例21	B－11	7／3	3×10^{9}
実施例22	B－11	4／6	1×10^{9}
実施例23	B－11	1／9	1×10^{10}
実施例24	B－12	7／3	2×10^{8}
実施例25	B－12	4／6	7×10^{8}
実施例26	B－12	1／9	1×10^{9}
実施例27	B－13	7／3	7×10^{9}
実施例28	B－13	4／6	2×10^{11}
実施例29	B－13	1／9	2×10^{9}
実施例30	B－14	4／1	7×10^{8}
実施例31	B－14	1／1	2×10^{11}
実施例32	B－15	7／3	1×10^{8}
実施例33	B－15	1／1	2×10^{9}

[0032]

[Table 4]

	高分子水性分散液（B）の種類	表面抵抗率（Ω）
比較例1	B－1	1×10^{14}以上
比較例2	B－2	1×10^{14}以上
比較例3	B－3	1×10^{14}以上
比較例4	B－4	4×10^{8}
比較例5	B－5	2×10^{13}
比較例6	B－6	1×10^{14}以上
比較例7	B－7	1×10^{14}以上
比較例8	B－8	1×10^{14}以上
比較例9	B－9	1×10^{14}以上
比較例10	B－10	1×10^{14}以上
比較例11	B－11	1×10^{14}以上
比較例12	B－12	1×10^{14}以上
比較例13	B－13	1×10^{14}以上
比較例14	B－14	1×10^{14}以上
比較例15	B－15	1×10^{14}以上

[Translation done.]